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Modern Surgery - Chapter 27. Diseases and Injuries of the Abdomen - The Pancreas

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by the stone lodging in Vater's diverticulum.* The duct may be opened, and after the removal of the stone closed by sutures or drained for a time, strands of gauze being carried down to the opening and in some cases a tube being carried up a dilated duct toward the liver (choledochotomy). If the stone is impacted near the outlet of the duct, it may be necessary to incise the duodenum in order to remove the stone (choledochoduodenostomy). A dilated bile-duct may be anastomosed to the bowel (choledocho-enterostomy) or to the surface (choledochostomy). The obstruction may be side-tracked by anastomosing the gall-bladder to the bowel (cholecystenterostomy) (p. 820), or a dilated duct to the bowel (choledocho-enterostomy). Cholecystenterostomy affords drainage but does not remove the cause of trouble, and infection is apt to be received from the bowel. In some rare cases of common duct obstruction, in which the gall-bladder is distended and the condition of the patient is desperate, anastomose the gall-bladder to the colon (Robson). In some cases the gall-bladder is removed (cholecystectomy). Cysticotomy is incision of the cystic duct.

DISEASES AND INJURIES OF THE PANCREAS.

Wounds and Injuries.—The pancreas is very rarely ruptured alone, although this sometimes occurs as the result of blows or crushes. In the majority of cases in which the pancreas is damaged, other organs are involved; for instance, the stomach, the spleen, and the liver. A gunshot wound of the pancreas is almost certain to injure the left kidney, the stomach, or the vertebral column. It will be remembered that in the case of President McKinley the bullet passed through the stomach, damaged the left kidney, and injured the pancreas.

Symptoms.—When the pancreas is injured alone, hemorrhage is not usually severe; but if adjacent organs are also damaged, it is sure to be profuse. Hence, when adjacent organs are damaged there are apt to be immediate symptoms of severe intra-abdominal hemorrhage; but profound collapse is not often present when the pancreas alone is injured. In fact, symptoms may not arise for a considerable length of time after injury of the pancreas. A diagnosis at this stage is impossible without exploratory operation. Injury of the pancreas is usually, but not invariably, fatal. After slight damage of the gland, the patient may completely recover; but, as a rule, he partly recovers and, after a number of weeks, a smooth tumor, palpable in the epigastric region, is formed. When operation is performed, this tumor is found to be back of the stomach. It contains a quantity of blood, clot, and pancreatic fluid. Such a fluid collection is in the lesser peritoneal cavity and is called a cyst, though it is not a true cyst of the pancreas. Robson and Moynihan, in their valuable treatise on "Diseases of the Pancreas," explain the formation of this collection of fluid as follows:

The injury lacerates the posterior layer of the lesser sac of the peritoneum and the pancreas, to which it is adherent. Blood and pancreatic fluid enter the lesser peritoneal sac. Peritonitis follows. The foramen of Winslow is blocked by adhesions; and the lesser peritoneal cavity, being now a closed sac, is distended with a serous exudation mixed with blood and pancreatic

* See A. W. Mayo Robson, in *Lancet*, April 12, 1902.

fluid. Collections of this character form very rapidly, and several pints may gather in a few days. Other results of injury to the pancreas are abscess, pancreatitis, and true cyst-formation.

Treatment.—In a gunshot wound of the abdomen, when exploration leads to the view that the pancreas has been injured, this organ should be approached by dividing either the gastrocolic omentum or the transverse mesocolon. The pancreas may also be exposed by dividing the gastrohepatic omentum. Accessory injuries must be carefully noted; and if a bullet has penetrated the posterior wall of the stomach, the pancreas is almost certain to be damaged. One should remember that, as Park says, even after opening the abdomen, it is difficult to explore the pancreas, especially in a stout person. If there is no evidence of posterior perforation of the stomach by a foreign body, one may assume that the pancreas has escaped. When the pancreas is exposed, if it is found to be bleeding, the vessels should be ligated and the tear in the gland should be sutured, care being taken not to puncture the main duct of the gland. If this duct has been cut, it must be carefully sutured. In some cases of gunshot wound it is necessary to resect a portion of the gland. At the termination of the operation, posterior drainage should always be used.

In cases of crush with pancreatic injury, the associated injury to other structures usually proves rapidly fatal; but in a less severe case the abdomen may be opened for exploration, and if this is done the surgeon should proceed as previously directed.

The question of excising a lacerated portion of the pancreas is one of great interest. It is known that dogs have lived after complete excision of the pancreas, but the operation is not justifiable in man.* In man, however, quite large-sized pieces of the gland have been removed and recovery has followed. Hence, it is justifiable to excise a hopelessly damaged portion, bearing in mind Park's caution that the chief danger in excising a portion of the pancreas is injury to the splenic artery.

Movable Pancreas.—In cases of splanchnoptosis the pancreas may become considerably displaced; though this condition cannot be recognized without opening the abdomen. So far, I know of no case in which fixation has been attempted; though, of course, theoretically it could be done.

Pancreatitis.—Pancreatitis often leads to the production of jaundice; always to very rapid loss of weight; occasionally to the presence of fat and sugar in the urine; sometimes to the presence of fat in the stools; and frequently to the condition known as fat-necrosis. Robson and Moynihan point out that when there is no diarrhea and the stools contain undigested muscle-fiber, one may assume that there is a deficiency in pancreatic juice; and, further, that when there is a blockage to the secretion from the pancreas, if 60 grains of salol are given by mouth during one day, carbolic and salicylic acids do not appear in the urine. The general cause of pancreatitis is infection. Often obstruction of the common bile-duct is followed by infection and suppuration of the pancreatic ducts and pancreatitis. Besides the general cause, which is infection, various exciting causes may be named; among which are gall-stones in the common duct and calculi in the pancreatic ducts, traumatism, cancer of the stomach or duodenum, catarrh of the stomach or duodenum,

* Park: *Annals of Surgery*, Dec. 15, 1901.

and many infectious diseases. It thus becomes evident that the infection may be by way of the blood; but undoubtedly, in the vast majority of cases, the infection comes by way of the duct. One manner in which the disease may be produced was suggested by Halsted and Opie, of Baltimore: A stone becomes impacted in the outlet of the common duct; the pancreatic duct, where it emerges above the common duct, not being blocked. The bile and pancreatic juice are thus prevented from entering the duodenum, and the bile flows back into the pancreatic ducts.

That strange condition known as fat-necrosis is often present in pancreatitis. In fat-necrosis the fat is decomposed into fatty acids and glycerin. The glycerin is absorbed; but the fatty acids unite with calcium salts and remain in the tissues, forming patches of yellowish-white color and varying size. These patches are found in the fat beneath the peritoneum, in the omentum, and in the mesentery; and even in distant parts (for instance, the pericardium).* It is an undoubted fact that fat-necrosis is not uncommonly found after diseases and injuries of the pancreas; and many assume that it is produced by the entering of the ferment of the pancreas into the fatty tissue. How the ferment gets there is a matter of some doubt. In the case of a wound of the pancreas, one can understand the flow of the secretion and its imbibition by adjacent parts; but in other cases one must assume that it has been absorbed by the lymphatics and distributed to more distant parts. When one reflects that in some conditions of the pancreas there is no fat-necrosis, while in others this condition arises, it is presumable that the pancreatic conditions associated with it are such as to permit the fat-splitting ferment to diffuse into neighboring tissues.

In pancreatic disease hemorrhage into that organ is common. The hemorrhage is not, of necessity, fatal; but frequently is so. Occasionally death takes place as the result of sudden pancreatic hemorrhage in a person apparently in excellent health. It is thought by Robson and Moynihan that during the existence of cancer of the pancreas there is a strong tendency to excessive hemorrhage after operation. In one case of my own the patient bled to death after the performance of cholecystotomy for obstructive jaundice. The oozing of blood in this case was from the margins of the gall-bladder and the adjacent peritoneal surfaces. We therefore conclude that in certain conditions of the pancreas there is a tendency to local hemorrhage in that organ; and that there may also be a tendency to the development of a general hemorrhagic diathesis, the general hemorrhagic tendency being much increased if jaundice exists. During acute inflammation of the pancreas hemorrhage is almost certain to occur into that gland; in other varieties of inflammation hemorrhage may occur or may be absent.

Forms of Pancreatitis.—This disease is divided by Robson and Moynihan into the acute, the subacute, and the chronic form; and they say that recorded cases demonstrate the fact that three distinct classes of inflammation may arise: (1) Cases that die within forty-eight hours of the beginning of the trouble. In this group hemorrhage is usually found; and if fat-necrosis is present, it is limited in area. (2) Those that live for some weeks after the beginning of the trouble. In these cases the pancreas may become necrotic or suppuration may occur. Fat-necrosis is usually widespread. (3)

* Robson and Moynihan, on "Diseases of the Pancreas."

In the third class of cases long-continued inflammation or repeated attacks produce sclerosis of the pancreas.

Acute Pancreatitis.—The symptoms of this condition come on suddenly and consist of violent pain in the epigastric region, vomiting, constipation, rapidity and weakness of the circulation, cold extremities, and collapse. The pain is extremely violent and is intensified in paroxysms, and there is distinct tenderness and rigidity in the epigastrium. The patient vomits the contents of the stomach and then bilious matter. Distention soon becomes distinct in the upper portion of the abdomen. The patient presents the appearance of one suffering with peritonitis. This condition is not unusually mistaken for intestinal obstruction, but in acute pancreatitis the constipation is not absolute; the patient passes wind, and may even have a bowel movement as the result of the administration of an enema. The condition is usually fatal within a few days; but in very rare instances recovery takes place.

The diagnosis cannot be made with certainty and is merely an inference. Reginald Fitz tells us that the existence of this disease should be suspected when a person previously in good health, or who has complained only of occasional attacks of digestive disorder, is suddenly seized with severe pain in the epigastric region, followed by vomiting and collapse; and when, within twenty-four hours or more, there appears a circumscribed swelling in the epigastrium, which is resistant or tympanitic. When an exploratory incision is made in the abdomen, if fat-necrosis is detected, the diagnosis becomes certain.

Treatment.—The exploratory operation is carried out in front. When exploratory incision suggests the condition, the infected area should be exposed either above or below the stomach, hemorrhage should be arrested by ligation or packing, and posterior drainage should be inserted. One should follow the rule laid down by Roswell Park, and explore in every case in which the disease is suspected to exist.

—**Subacute Pancreatitis.**—Subacute pancreatitis comes on suddenly, with violent pain, vomiting, and constipation; but there is far less exhaustion and weakness than in the acute form. The vomiting is less marked and the swelling in the epigastric region is not so rapid. The symptoms are similar to those of the acute form, but not so violent nor so rapidly progressive. The temperature frequently rises higher than in the acute form; and it may become irregular, or chills may occur. In many cases the patient seems to grow better after a time, the violent pain abating, though some pain and tenderness remain; but he does not gather strength and continues to lose flesh, and there is usually albumin, and occasionally sugar, in the urine. In rare instances fat is found in the urine. In subacute pancreatitis abscess is prone to form. This abscess may make a distinct swelling in front, and may lead to the development of a subphrenic or of a perirenal abscess. In rare cases an abscess of the pancreas tracks its way for a long distance in the subperitoneal tissue; occasionally it opens into the stomach or bowel. Cases of subacute pancreatitis occasionally recover after a long illness, but usually they die.

Treatment.—Exploratory incision. Expose the pancreas, either above or below the stomach; determine the condition; remove purulent matter and necrotic areas; arrest hemorrhage with packing; and insert posterior drainage

at the costovertebral angle. In some cases close the anterior wound, and in others leave it open.*

Wm. J. Mayo † reports a successful operation for subacute pancreatitis. The patient was a man of fifty-two years, who, seven days before Mayo saw him, had developed violent pain in the epigastrium, collapse, distention, and other signs of intestinal obstruction; but some slight movements had taken place from the bowels, as the result of medication. On admission, the abdomen was tympanitic. An ill-defined mass the size of a fist could be palpated to the right of and above the umbilicus. The pulse was 120 and very weak; the temperature, between 101 and 102; and there was slight jaundice, restlessness, and hiccough. A diagnosis of gangrenous cholecystitis was made. The abdomen was opened, and the omentum was found to be studded with thick, adherent, infiltrated round spots, the size of a pea or larger. There were some similar spots in the mesentery, and the peritoneal cavity contained bloody fluid. On palpation, the pancreas felt like a pudding in a tight sac; and on aspiration, a little blood was obtained. The gall-bladder was opened, a stone was removed, and some pus was evacuated. Drainage was inserted into the gall-bladder; and eighteen days later there was an enormous flow of bloody fluid, containing bile and pancreatic juice, from the drainage-tube. The patient recovered. This plan of treatment—free drainage of the pancreas by the performing of cholecystotomy—is to be taken into consideration.

Chronic Pancreatitis.—This usually results from disease of the bile-passages. It produces enlargement of the organ; and the enlarged area is hard, and feels like a malignant growth. This condition is more common than is the acute or the subacute form. Robson and Moynihan have operated upon thirty cases. The disease is frequently associated with gall-stones or with stones in the pancreatic duct, and occasionally with ulcer of the stomach or of the duodenum. In some cases the condition comes on acutely and jaundice develops rapidly, as it does after the passage of a gall-stone. It is noted, however, that the pain is not in the region of the gall-bladder, but is in the middle of the epigastrium; and it passes to the left, rather than to the right. The tenderness, too, is in the middle of the epigastrium, and not in the gall-bladder region. A series of these attacks may occur, the jaundice growing worse after each attack. In some cases, however, the condition comes on gradually and insidiously, the pain slowly developing, but no violent seizures taking place. There is rigidity of the rectus muscles, rapid loss of flesh, usually vomiting, and considerable flatulence. The gall-bladder is enlarged and commonly palpable.

Treatment.—Exploratory incision, and opening or draining the gall-bladder; or the performing of cholecystenterostomy.

Pancreatic Calculi.—When the pancreatic secretion is blocked, stones tend to form; and the blocking may be due to inflammation of the duct of Wirsung, or may result from chronic pancreatitis. The stones may be single or multiple.

Symptoms.—There is pain in the epigastric region, which usually comes on in paroxysms that resemble those due to gall-stones, though they are not

* Roswell Park: *Annals of Surgery*, December 15, 1901.

† *Jour. Am. Med. Assoc.*, Jan. 11, 1902.

so violent. Pain is accompanied with vomiting, exhaustion, and sometimes actual collapse; and may be followed by rigors. Portions of stone are sometimes recovered from the feces, and sugar is occasionally found in the urine. Fat has also been noted in the stools in some cases. Sometimes jaundice develops, because the calculus presses upon the common duct.

Treatment.—Pancreatic calculi have, in rare instances, been removed by operation; and this is the proper procedure when the diagnosis can be made. The diagnosis is, however, possible only after exploratory incision. As a rule, no operation is performed until a cyst results or an abscess forms; and when the cyst or abscess is opened, fragments of stone may be found in the fluid, and stones may subsequently come away in the resulting fistula.

Pancreatic Cysts.—Many forms of cyst may develop in the pancreas; the following are set forth by Robson and Moynihan: (1) Retention cysts; (2) proliferation cysts, including cystic adenoma and cystic epithelioma; (3) hydatid cysts; (4) congenital cysts; (5) hemorrhagic cysts; and (6) pseudocysts. What we speak of as pseudocysts have already been considered in discussing effusions into the lesser peritoneal cavity. They result from lacerations of the pancreas. Retention cysts are due to blocking of the pancreatic duct. Congenital cystic disease is extremely rare. Hemorrhagic cysts result from hemorrhage into the substance of the pancreas itself.

Symptoms.—Cysts are somewhat more common in men than in women. A cyst of the pancreas proper is more often met with in the head of the organ than in its body or tail. The cyst may be single or multiple. In its growth it either destroys the substance of the pancreas; or it grows away from the pancreas and damages it but little. In some cases the cysts grow to a very large size; and Robson and Moynihan refer to a case in which the cyst attained the size of a man's head, and to another in which it was the size of a full-term pregnancy. A pancreatic cyst is smooth, round, elastic, and rather tense (Robson and Moynihan). The contained fluid varies greatly. As a rule, it is brownish-red in color; in one case upon which I operated it was clear yellow; in some cases it is milky, and in others it is nearly black. The fluid is always albuminous. Urea may be present, and in many cases pancreatic ferments are found. In most cases the cyst adheres so closely to the surrounding structures as to render extirpation practically impossible. A pancreatic cyst of considerable size causes epigastric discomfort, pain during digestion, and frequently vomiting. In some cases the pain is trivial; in others, it is very violent. As a general rule, the patient is constipated; but sometimes diarrhea occurs, and the movements may even contain blood. If the tumor presses upon the common bile-duct, jaundice will develop. The patient loses flesh markedly and with considerable rapidity, and he becomes very weak. In rare instances fat is present in the stools, and in other unusual cases sugar is found in the urine. A test should always be made with salol, to see whether pancreatic ferment is present in the intestine (page 765). In the beginning the pancreatic cyst is behind the stomach; but it enlarges and, as a rule, pushes the stomach upward and to the right side, and the transverse colon downward. The cyst approaches the surface of the abdomen below the greater curvature of the stomach (Robson and Moynihan). The same authors tell us that in rare cases the cyst appears at the upper border of the stomach, and that in others it inserts itself between

the layers of the transverse mesocolon. In the case upon which I operated it had worked its way through the subperitoneal tissue into the right loin, and had been looked upon by Professor Montgomery and myself as a hydro-nephrosis. As a rule, the pancreatic cyst is immovable; but in rare instances it is movable. When a hand is placed in the loin and another on the abdomen, ballottement may be appreciated. If the distended stomach or colon overlies the tumor, there will be a tympanitic percussion-note; but when the tumor reaches the abdominal wall, there will be a dull percussion-note. On inquiring into the history of these cases, it will frequently be found that there has been a severe injury to the upper abdomen.

Treatment.—Exploratory incision makes the condition clear. In the majority of cases the cyst is incised, emptied, and stitched to the wall of the abdomen. This operation may be done in two stages, first exposing the cyst and fixing it to the abdominal wall; and, when adhesions have formed, opening it. As a rule, however, it is performed in one stage, the abdominal cavity being carefully protected with gauze. Some authors advocate exposing the cyst, opening and evacuating it through the abdominal wound, and draining through the loin. Complete extirpation is usually impossible because of the adherence of the cyst. If the cyst is movable, extirpation may be carried out; but incision and drainage is the safest operation.

Tumors and Other Growths of the Pancreas.—The pancreas may be affected with sarcoma, carcinoma, adenoma, tuberculous disease, or syphilis.

Treatment.—Attempts have been made to remove tumors of the pancreas. After an exploratory incision has determined the condition, the pancreas is exposed at the point at which the tumor projects. This is usually done by an opening in the gastrocolic omentum. If the tumor is in the tail of the pancreas, however, the exposure may be effected in the flank. When the tumor has been exposed, an attempt may be made to enucleate it. At the present time, however, these operations are in the experimental stage; though tumors of the splenic portion of the pancreas have been removed.

INJURIES AND DISEASES OF THE SPLEEN.

Wounds and Rupture.—A wound of the spleen causes great hemorrhage, and if no surgical aid is offered will rapidly produce death.

Rupture of the spleen produces the signs and symptoms of intra-abdominal hemorrhage. The blood clots so rapidly that it gathers in the left loin, and is not commonly diffused throughout the abdomen. Exploratory incision will be required to positively recognize the condition. In Elder's table there are 52 uncomplicated cases. Not a case was operated upon (operation was not the rule until 1890) and 84.6 per cent. died. Eisendrath has collected 50 cases operated upon: 56 per cent. recovered and 44 per cent. died.* F evrier † has collected 56 ruptures of the spleen. In 46 cases operation was performed and the mortality was 50 per cent.

Treatment.—The treatment is evident from the previous remarks. It

* Daniel N. Eisendrath: Jour. Am. Med. Assoc., Oct. 25, 1902.

† Rev. de Chir., Nov., 1901.